

Impact of topography, N fertilization and fungicide application on diseases, yield and seed quality of canola in north-central Saskatchewan

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Abstract

Successful application of precision farming technology on hummocky landscapes of the prairies requires information on crop response to many factors including fertilization and disease management. The objective of this study was to determine the effects of slope position, nitrogen (N) fertilization and fungicide application on disease occurrence, yield, seed quality, N uptake and recovery of applied fertilizer N in canola (*Brassica napus* L.). Field experiments in 1998 to 2001 were conducted near Prince Albert, Saskatchewan in the Parkland region. As N rate was increased incidence of blackleg (*Leptosphaeria maculans*) and sclerotinia stem rot (*Sclerotinia sclerotiorum*), seed and biomass yield, protein content and N uptake in seed and % green seed increased, while emergence, thousand kernel weight (TKW) and % recovery of fertilizer N declined. Lower slope positions tended to have greater seed and biomass yield than upper slope positions, and lower incidence of blackleg. Seed yield without N fertilization was less at upper slope positions than at lower. The response of seed yield to N fertilization was relatively greater at upper slope positions than at lower. Application of fungicides reduced both blackleg and sclerotinia stem rot incidence, and tended to increase seed and biomass yield. Fungicide application to control blackleg tended to be more beneficial at higher N rates and on upper slope positions. Since sclerotinia incidence was generally low, there appeared to be no strong association with N rate or slope position. In summary, the results suggest that for optimum seed yield lower slope positions would require less fertilizer N (55.2 kg N ha⁻¹) compared to upper slope positions (82.8 kg N ha⁻¹) when fungicides are applied. When blackleg disease is severe, fungicide application to control blackleg at upper slope position appears to be a good strategy.